Van Bibber (John)

A

NEW APPARATUS

FOR

EXTENSOR PARALYSIS.

BY

JOHN VAN BIBBER, M. D.

[*REPRINTED FROM THE NEW YORK MEDICAL JOURNAL, MAY, 1874.*]

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1874.

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A NEW APPARATUS FOR EXTENSOR PARALYSIS.

At the February meeting of the New York Society of Neurology and Electrology, I had the honor to present a case of lead-paralysis,[1] treated by an apparatus designed not only to correct the deformity, but also to act as a means of more rapid and complete cure. The plan of treatment should be equally applicable to many paralyzed conditions, but the appliance which I shall here describe is especially intended for extensor paralysis of the forearm, whether it be from toxic or from other causes. The very interesting paper of Dr. Wm. R. Fisher (New York Medical Journal, May, 1873), on "The Effects of Tension and Relaxation of Muscle upon Electro-Muscular Contractility," first called my attention to the fact that the position of a muscle would influence to a marked degree its reaction to an electric current. Dr. Fisher showed by experiment that muscles in a relaxed condition respond much better to the stimulus of electricity than when they are stretched, or in a state of tension.

If, then, the position of a muscle has such a marked effect upon the action of an electric current, it is but reasonable to suppose that the element of position is much more important than it has heretofore been considered, and that paralyzed muscles, forced by their antagonists into abnormal positions,

[1] I am under many obligations to my friend Dr. Jno. J. Mason for allowing me to select this case from his large and interesting clinic.

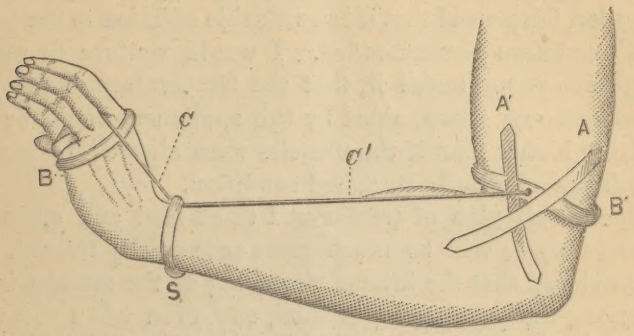
are not in a favorable state to promote recovery. In fact, it is self-evident that a muscle with its fibres stretched to their utmost capacity for any length of time, is in a totally unphysiological condition. In the case of paralysis before mentioned, it was thought, if the extensor group could by mechanical means be placed in a more natural position, and the muscular fibres relieved from their constantly stretched condition, that there might be reasonable hope of a more speedy recovery.

After many attempts to secure this advantage by means of strips of plaster, it was determined to try the India-rubber muscle as used by Dr. Lewis A. Sayre in orthopedic surgery. The great difficulty in the use of such an appliance was to effect its application without causing injurious pressure upon the circulation of the arm and hand. I am not aware that these elastic tubes have been used before to correct this deformity, or attached by a method so simple and so free from pressure as that which I shall now describe. Two bands of inelastic webbing, pierced by eyelets at certain points, and each having a convenient buckle, serve as points of attachment. The one for the hand, about three-quarters of an inch wide, so made, that the free end placed upon the palm pointing toward the thenar eminence, and the eyelet-hole resting on the ball of little finger, the band folded once around that finger and passed over dorsum of the hand, the buckle would come in a convenient place upon the palmar surface. The band for the arm about one inch in width, so arranged that, the eyelet being placed upon a line a little above the external condyle, the buckle would rest upon the internal surface of the arm.

As seen in the illustration, two transverse strips of plaster are adjusted to the arm so as to form an angle just below the eyelet, and thus relieve the band, which should be buckled loosely, from all injurious traction. The fold around the little finger, and the muscle resting upon the webbing on the dorsum of the hand, enable us to buckle the band loose enough to insure perfect abduction of all the fingers. Finally, a piece of India-rubber tubing of correct length and medium elasticity, with one of Dr. Sayre's metallic hooks attached at each end, constitutes the entire apparatus.

Looking upon this artificial muscle as performing to some

extent the duty of those paralyzed, I can probably best describe its application by saying, in anatomical language, that it arises from a point a little above the external condyle, and passing downward on the extensor surface of forearm, under the cuff, which we might call the annular ligament, forward over dorsal aspect of the hand, passing between the index and second fingers, which serve as a trochlea or pulley, then transversely across the palmar surface of the hand, and is inserted at a point about the articulation of the fifth metacarpal bone with its first phalange.



AA', strips of plaster; *BB'*, bands around hand and arm; *CC'*, India-rubber muscle; *S*, shirt-sleeve acting as ligament.

By this means, in a condition of extensor paralysis, we secure an artificial muscle, easy of application, and efficient in action, and, above all, that can be applied without exerting undue pressure at any point.

Perfect relaxation of muscle by mechanical means would not, I am confident, accomplish the results I have seen from the use of this instrument, and at the same time would not give to the patient as useful a hand. For here, without having power in the extensor group, we simulate as nearly as possible Nature herself, and in the daily uses of the arm, by alternate relaxation and contraction, we bring the muscles as near their normal movements as the deformity will allow. And I would place great emphasis upon this point, that in these changes of position we have changes in circulation; that when the muscle is intensely stretched, the capillary vessels are pressed upon, and their calibre reduced; while, on the other hand, in a re-

laxed condition of the muscle, nutrition can go on with less interference. Certainly in health, only by movement and exercise, can we produce developed muscle. Therefore, when the power of motion is lost, when paralysis has deprived any muscles of an element so important to them in their normal state, we should in our treatment endeavor to imitate their natural action as the surest means of bringing about recuperation.

Experience has shown that treatment by electricity is rewarded by good results, but only after long and patient care; and the one case thus far treated by the method suggested in this paper, has proved that it is a valuable addition to the treatment heretofore recommended. I would venture to assert, though I have not tested it, that the temperature of the paralyzed extensor group, aided by this appliance, would be appreciably higher than if the muscles were allowed to remain in their pathologically stretched condition.

Under this plan of treatment I think lead and other extensor paralyses will be much more successfully treated, as I am convinced that the intense stretching of the muscles tends to prolong the paralyzed condition, and, even when recovery would otherwise take place, this unnatural position prevents the muscles from regaining their contractility.

I have also lately tried this method, in a case of ptosis, by attaching a thin ribbon of India-rubber to the upper eyelid and forehead by means of court-plaster, which, when dry, is painted over with collodion. The case is now under observation. The patient experiences much comfort from the appliance, as, the recti muscles being but slightly involved, he is rarely troubled with diplopia. The elasticity of the rubber allows the patient to close the eye, but upon ceasing muscular effort the eye is again opened.

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